ASSEMBLY OF ENGINEERING
NATIONAL RESEARCH COUNCIL

Nov. 17, 1981

For Your Information

Harry -

Here are three items to see.

1) "Your" response to the reviews of the report. This is now with Leonid Hurwicz of the University of Minnesota.

2) Your transmittal letter to Frank Press. (No one has seen this yet. Make any changes, corrections, deletions, or additions you deem fit.)

3) David Hazen's last (and only) comment on the report.

My new telephone number is 334-2190.

EXECUTIVE OFFICE

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NATIONAL RESEARCH COUNCIL

ASSEMBLY OF ENGINEERING

2101 Constitution Avenue Washington, D.C. 20418

Diesel Impacts Study Committee November 10, 1981

Memorandum

To: Dr. Bryce Crawford Jr., Chairman, Report Review Committee

From: Henry S. Rowen, Chairman, Diesel Impacts Study Committee

Subject: Response to Reviewers of "Diesel Cars: Benefits, Risks, and Public Policy"

On behalf of the members of the Diesel Impacts Study Committee, I am pleased to send you a copy of the final draft of our report, "Diesel Cars: Benefits, Risks and Public Policy," and our response to the concerns expressed by the reviewers of the report. The report now contains the changes and corrections we have made as a result of the review. It also contains many revisions and emendations that the members have requested. The committee and I consider the report to be ready for release to the government sponsors and the public.

Before addressing the comments of the reviewers, I want to make an observation. Last October 31, before I presented the highlights of the report to members of the Governing Board, I was privileged to listen to a discussion of proposed guidelines for risk assessments performed within the National Research Council. I was heartened to find that our committee's report fufills the guidelines in all relevant respects. Thus, you will find in the Preface a description of the charge and scope of the study, reference to previous studies on similar issues that have been conducted by committees of the National Research Council, a characterization of the committee and its methodology, and an explanation about three panel members who either left the study because they had moved to jobs that could be considered in conflict with the committee's independence or resigned in disagreement with an aspect of the study. We have sought to be open and above-board about such matters. The committee responsible for the report is listed at the front, while the panel members, consultants, and contributors have been listed in Appendix A. All other publications from the study are itemized in Appendix B.

One other element of the guidelines should be noted here. In the Summary and at appropriate places in the report, we have called attention to the uncertainties and contradictory data associated with the information gathered and the findings presented. It happens that at least two of the reviewers have voiced their approval of our handling of uncertainties in the report.

In general the reviewers were complimentary in the extreme about the report. As gratifying as this has been to the committee, it did not deter some members from attempting to improve and clarify the report.

Reviewers 1, 2, and 3 followed the Guidelines to Review of Reports prepared by the Report Review Committee in their comments, concluding that the draft met the tests of a responsive, balanced, complete document. Two Assembly of Engineering reviewers found the report to be much better than most produced by committees of the National Research Council, and Dr. Mac Lane expressed his [redacted] appreciation to the committee for "presenting a much more realistic and cautious" discussion of cost-benefit analysis than he has seen previously.

The response below is arranged by section or chapter. Whenever possible, I have referred to the review draft page by its hyphenated number, as, for instance, 3-13 or 6-7, and the final draft by its page.

The Preface and Summary have been completely revised and rewritten. The Summary now tracks the report, with sections on emissions control technology, environmental and health effects, economic implications, and regulatory policy analysis. The Summary sections capture many of the important findings and conclusions of the report, and, taken together, it expresses the principal themes and overall tone that the committee wants to sound. In this way, the committee holds that it has satisfied the concerns of Reviewers 3, 4, and 6, who had argued for a better Summary. Among the changes made here, CAFE has been explained on page xv (and later on p. 1 of the Introduction), and the sentence that Reviewer 2 called "back-paddling" (that the committee does not find its conclusions conclusive) has been removed.

Chapter 1 has been reconsidered, revised, and rewritten, in line with the concerns of Reviewers 3 and 7. It now begins the way Reviewer 3 has suggested. Reviewer 1's concern about the so-called "gas-guzzler tax" has been dealt with in the section about the Clean Air Act. The increased sale of diesel cars is described at the outset of Chapter 1 and in the footnote on p. 3. Some concerns of Reviewer 2 are clarified here or later. For example, the price of diesel fuel is discussed in Chapter 2, pp. 33-34, and in Chapter 5, especially Table 5.4, p. 90. Reviewer 2 also noted an apparent inconsistency in the size of diesel particulates. He may have missed reading the word "mean" before the word "diameter." The mean diameter of diesel particulates is 0,2 um, and the size of particles have been measured in a range from 0.06 to 0.7 um in diameter. His comment about diesel noise would startle many who recognize diesels by their characteristic sound--the rattle or clatter of diesel engines. In another comment by Reviewer 2, he seems to accuse the automobile manufacturers of attempting to "foist" large cars on the public by producing large-sized diesels. Diesel cars now appear in many configurations, as explained on p. 1, though if a recent survey by Market Opinion Research is correct, American motorists claim to prefer large or midsize cars to smaller compacts and subcompacts (See The New York Times, November 8, 1981). Reviewer 2's request for an explanation of the energy content of diesel fuel appears in Chapter 2.

Chapter 2 has been reorganized and its allegedly "pro-diesel" tone has been subdued or largely silenced. This should go a long way toward meeting the concerns of Reviewer 7. In the draft sent for review, this chapter consisted of the summary of the Technology Panel's prospective report. For the final report, additional text and explanation from the panel's report have been added to the chapter. The panel's conclusions regarding public policy have been removed. The conclusions about oil company investments and refinery production are considered to be correct and are not altered. Since the panel's work was completed in August 1980, the prices of diesel fuel and gasoline have converged in most places. Both are now abundant in the United States--largely the result of several factors, including a conservation ethic brought on largely by higher prices, improved fuel mileage for most new cars, and the slowdown of the nation's economy. As a consequence, refiners have been able to make adjustments without large investments. It turns out that diesel fuel prices have justified the statements on pp. 33-34. Reviewer 5, who raised questions about fuel prices, also asked about the higher cost of diesel engines. The committee concludes that so long as the market demand for diesels remains high, the premium price of diesel cars will persist--perhaps set artificially, as is the case with automatic transmissions in gasoline-fueled cars that are traditionally higher priced than manual transmissions. Currently, the price difference between diesels and gasoline-powered cars remains in the range ststed in the report. Reviewer 5 asks for added discussion about the development of a trap oxidizer emissions control device. While several lines of R & D are under way, the committee prefers not to provide a detailed examination of the various approaches to diesel emissions control. The statements about control technology have been expanded on pp. 34-35.

Chapter 3 is another part of the report that has engaged Reviewer 2. His concerns about the mean diameter of particulates, the light-scattering cross-section of particles, and the light-extinction characteristics of particles have been handled by corrections when deemed appropriate (see pp. 41, 45, and 48). The committee's statements about σ are not considered inaccurate and are in line with the research of Lipkea and Gorse. His comment about NO "eventually" converting to NO_2 is correct, though much of the NO is not converted for hours, long enough to be blown alsewhere--out above the Atlantic Ocean, for instance, in the case of the East Coast of the United States. The question of NO conversion is important, and much more study needs to be made before definitive statements appear. In the sense used on 3-12, the statement about NO is deemed correct (p. 43). Regarding Reviewer 2's comment about projecting problems in U.S. cities from the case of London (p. 3-16), the committee once attempted to do just that. It sought out air pollution records for such "dieselized" cities as Vienna and London, and in reviewing the data it found that European cities do not contain more than 6 to 7 percent of diesel cars and that no definitive conclusions can be drawn from the situation. His comment about "roadways" on 3-10 should not be meant as "highways" but as any roads. Concerning his comment about p. 3-24, the committee was asked to limit its study to mobile sources of diesel emissions, most specifically

to light-duty vehicles. Therefore, it did not consider comparing NO_x or any other pollutant from mobile sources with stationary sources, such as electric-generating plants--though, of course, the data are available from the U.S. Environmental Protection Agency and other sources. The committee has made some comparisons of light-duty diesel emissions with heavy-duty diesel emissions and with gasoline-fueled vehicles. Another committee of the National Research Council has reported extensively on NO_x emissions--notably, the Committee on Medical and Biologic Effects of Environmental Pollutants in Nitrogen Oxides (1977). Other suggestions by Reviewer 2 have been adopted. These include the use of "inorganic" in place of "organic" and the elimination of supercharger from 2-22.

Reviewer 5 is correct about CO as a surrogate for particulates in the atmospheric model depicting dispersion and dilution. On p. 43 et seq. the report addresses this, as well as the limitations of the model. Chapter 3 discusses visibility and the values assigned under willingness-to-pay situations. The uncertainties are stated. In this chapter, more research is called for in the Environmental Research Agenda.

Chapter 4 appears to have elicitied only one concern. Reviewer 7 asks for additional discussion of benzo(a)pyrene. This is now found on p. 70 et seq. and in the Health Panel's published report, Health Effects of Exposure to Diesel Exhaust (1981, p. 57 et seq.).

In Chapter 5, Table 5.4 has been corrected to show the list under 10 percent first, as Reviewer 2 has noted.

Chapter 6 has been reduced considerably in length and, as a result, tightened editorially. Reviewer 7 has observed its largely "tutorial" nature, though the committee and, apparently, Dr. Mac Lane consider it to be useful and instructive. All references to the "social discount rate" have been removed from the chapter, which should handle the concerns of Reviewer 7 and Dr. Wall.

Chapter 7 has undergone a thorough reworking so that the analysis of "regrets" is more carefully explained and related to the chapters on health, environment, and economics. This chapter now contains a "decision flow" or "decision tree" diagram and an explanation of the assumptions used for the various cases in the committee's model for 0.6 g/mi, 0.2 g/mi, and the intermediate case (pp. 118-119). Sections on "value of life" and "willingness to pay" are included (pp. 122-123), on the Harris analysis (pp. 109-111) and on visibility (pp. 112-113) have been clarified. The assumptions are more clearly delineated in all cases, as Reviewers 7 and Dr. Wall have requested. Dr. Mac Lane's concern about the "striking conclusion" on p. 7-34 regarding the seven times more damaging consequences of imposing the 0.2 g/mi standard over retaining the 0.6 g/mi standard is resolved in Dr. Mac Lane's own suggested rewording. The report now says "the maximum regrets associated with the 0.2 g/mi standard are several times greater than those for the 0.6 g/mi standard" (p. 126). This part of Chapter 7 has been considerably discussed and revised, as one would expect from the results.